

June 8. By Entomological Ranger F. B. Herbert—July 7, 1915, a female flying in the forest at the Pyramid Ranger Station, Calif; July 17, 1915, at Fallen Leaf, Calif., a female crawling on a dead white fir (*Abies concolor*); and May 5, 1916, at Placerville, Calif., a female on the stump of a yellow pine (*Pinus ponderosa*) treated in February, 1915, in the control work against the western pine beetle (*Dendroctonus brevicomis*).

Probably the most interesting point connected with the life history of *Oryssus* is what becomes of the long external ovipositor of the pupa upon transformation to the adult. The actual transformation was not observed so this is a point to be determined by future study. Another point to be determined is the exact length of the life cycle. The larvae of the genus *Buprestis* upon which the *Oryssus* is parasitic live for several years in the wood of the host plant. So far the *Oryssus* larvae have been found only with the large larvae of the *Buprestis*. Whether they are internal feeders when small in the small larvae of the *Buprestis* or whether they attack only the large larvae are points for future determination.

The specimens upon which these observations were made will be turned over to Mr. S. A. Rohwer for taxonomic study. As the larvae appear quite different from the typical horntail (*Siricoidea*) larva and the habits are quite different, the systematic position of *Oryssus* in the classification of the Hymenoptera may be changed.

IDIOGASTRA, A NEW SUBORDER OF HYMENOPTERA WITH NOTES ON THE IMMATURE STAGES OF ORYSSUS.

By S. A. ROHWER, *Specialist in Forest Hymenoptera*, AND R. A. CUSHMAN,
Entomological Assistant,

Bureau of Entomology, Washington, D. C.

The summary by Rohwer of the literature dealing with the habits of the oryssoids published in 1912 (Proc. U. S. Nat. Mus., vol. 43, p. 141), shows the conflicting suppositions explaining the habits of the members of this interesting group. The importance of the discovery of the larva of *Oryssus occidentalis* and its habits by Mr. H. E. Burke are very manifest and have called forth the remarks on the position of the group offered below.

While the authors do not believe that the biology or any characters especially developed by unusual habits should be made the primary reason for systematic groups we do believe that biology offers a good index to affinities and gives valuable suggestions as to

the use of stable body characters. It is also possible that unusual habits may be the cause for the development of unusual characters which may be very valuable taxonomically, but may not necessarily express the true relationships.

In raising the oryssoids to subordinal rank we have only expressed in a taxonomic way the unusual, valuable, and striking differences which exist between them and the *Chalastogastra* and we believe that the parasitic habit of the larva indicates that these characters are of subordinal value.

As early as 1829 Macleay suggested that the sawflies could constitute a separate order and proposed the name *Bomboptera* and now in 1916 Crampton (*Ent. News*, vol. 27, p. 303) without definitely limiting or giving any defining characters and for apparently no other than theoretical reasons says: "The Hymenopterous insects should be divided into two orders, the *Prohymenoptera* or Tenthrenid group, and the *Hymenoptera* proper." We can see no real advantage in dividing the order Hymenoptera, as usually defined, into two orders and we believe that the group, as usually treated, is a homogeneous unit for which ordinal division is unnecessary and undesirable. The subordinal group *Idiogastra* is in itself sufficient reason to discard the ordinal names *Bomboptera* and *Prohymenoptera*.

LARVA OF *Oryssus occidentalis*.

(Description drawn from alcoholic specimens.)

The larva is white, subcylindrical, about one-third as thick as long, tapering slightly at each end, and somewhat flattened dorso-ventrally. The caudal extremity is slightly upcurved. The constriction between the head and thorax is rather weak. The head is very short antero-posteriorly and less than half as broad as the greatest diameter of the body. The antennae are tubercle-like and set at the summits of rounded elevations. The mouth-parts are very simple, the labrum, labium, and maxillae being merely fleshy lobes, the last not divided into the usual parts. On each side of the middle of the labrum and near the apex is an irregular group of minute sensory papillae. The labial and maxillary palpi are apparently not at all developed, but on the surface of the labium are a few short, stout setae and on the maxillae in a brownish area a few sensory papillae. The mandibles are heavily chitinized, curved, narrow, and tridentate at apex, the outside teeth equal and shorter than the median, broad at base and articulating internally with heavily chitinized points at the dorsal and ventral angles. The ventral articulation extends, weakly chitinized, along the suture between the epicranium and the soft ventral surface of the head. There is also a weakly chitinized ridge internally along the lower edge of the maxilla. On plate XII, figure 1, these chitinized ridges and the concealed portions of the mandibles are indicated by stippling.

Each thoracic and abdominal segment has dorsally at each side of the middle a low, transverse elevation surmounted by a transverse row of four or five short, stout, backward pointing spines. The mesothoracic, metathoracic, and first eight abdominal segments bear spiracles. Those of the mesothorax are situated in the intersegmental skin between the prothorax and mesothorax, apparently on the prothorax. Those of the metathorax are rudimentary and nonfunctional, and are, like those of the abdominal segments, situated near the anterior margin of the segment. The larva is legless, but the positions of the legs are indicated by chitinized disks.

PUPA OF *Oryssus occidentalis*.

(Descriptions drawn from alcoholic specimens.)

Female.—Uncolored. In general the head, thorax and base of abdomen resemble the adult but the most striking difference occurs in the ovipositor and sheath which is curved up over the back and reaches the anterior margin of the head. Head much as in adult, even to the definition of the tubercles around the ocelli; the pupal skin enclosing the antennae obscures the joints but from what can be seen the ninth is not abnormally swollen and is connected with the tenth by its entire apical width; tarsi jointed as in adult; thorax much the same as to the sutures (these not well defined in adult); the straight suture separating the scutum and scutellum, which is strong in the adult, is weak in the pupa and the suture dividing the scutellum, which is weak in the adult, is strong in the pupa. Abdomen with seven well defined, visible tergites, the first not divided, the eighth tergite smaller than the seventh; ninth tergite represented dorsally as a narrow plate but produced anteriorly and ventrally; tenth tergite not clearly defined but probably represented at the apical end of the ninth as a transverse plate; second to eighth tergites, inclusive, with a series of fleshy protuberances surmounted by transverse rows of spines near apical lateral margin. First sternite concealed, the six following well defined, the second nearly covered by hind coxae, the remaining uncovered and visible; eighth and ninth sternites not visible except as represented by their appendages; tenth sternite not visible externally; pleural fold fleshy. The external portion of the ovipositor as described above; internally it extends forward into the mesothorax where it makes a simple loop.

The following are the most striking differences between the female pupa and adult.

1. Ninth antennal joint normal.
2. Scutum without lateral sutures.
3. Accessory suture of scutellum strong.
4. Suture between scutum and scutellum weak.
5. Tergites with fleshy protuberances.
6. Apical tergites and sternites different.
7. Ovipositor curled up over the back.

Male.—A pupal envelop which contains a nearly fully colored adult does not show, without dissection anything especially extraordinary. The pupal envelop shows the thoracic structure of the female pupa, spines on apical margins of tergites two to eight inclusive; and sternites two to six inclusive.

SUBORDER IDIOGASTRA, NEW SUBORDER.

This suborder is proposed for the superfamily Oryussoidea as defined by Rohwer in 1911 (Proc. Ent. Soc. Wash., vol. 12, no. 4, p. 217) and 1912 (Proc. U. S. Nat. Mus., vol. 43, p. 146).

As a systematic division the suborder Idiogastra has long been recognized but it is only comparatively recently (MacGillivray, 1906, Enslin, 1911, Rohwer, 1911, 1912) that it has been considered as an unusually well defined group. From the standpoint of the adult this suborder is more closely allied to the Siroicoid part of the Chalastogastra but it may be easily separated from all the Chalastogastra by the marked reduction of wing veins which resembles, except for the presence of a complete anal cell, some braconids;¹ the curious position for the insertion of the antennae, in which it resembles the Stephanidae; in the loss of the metapostnotum in which it resembles the Clistogastra; in the remarkable invaginated ovipositor, in which it is not approached by any other Hymenopteran; in the longitudinally divided ninth and tenth tergites an analogy of which may be found in some of the Clistogastra; and in the male genitalia which more closely resemble those of the Clistogastra. From the standpoint of the larva the Idiogastra are much more closely allied to the Clistogastra and it is only with hesitancy that we offer the characters in the following key, for it is certain that the larvae of the Clistogastra are very imperfectly known and it is possible that it will ultimately be found very difficult to separate the suborders Idiogastra and Clistogastra on larval characters. Briefly expressed the suborder Idiogastra stands intermediate between the suborder Chalastogastra—where the adult would place it—and the suborder Clistogastra—with which the larva would ally it.

Adult characters.:—The face is prolonged below into a prominent flange, below which the antennae are inserted, and which extends laterally and posteriorly forming a scrobe for the reception of the basal part of the antenna; the antennae are inserted below the lower eye margin; the clypeus is fused with the face

¹ In some braconids (*Helconidea*, etc.) two interanal veins are present which if connected by the last apical abscissa of anal would make a wing not greatly unlike *Oryssus*.

and concealed below the facial flange; the labrum is small, free, present between bases of mandibles; the vertex is tuberculate; the antennae of the female are 10-jointed, with the ninth joint large and the apical one small, in the male they are slender, normal and 11-jointed; the pronotum is narrow, the posterior margin arcuate; the mesoscutellum is truncate anteriorly and separated from the mesoscutum by its entire width; the metapostnotum is wanting; the wings have two cubital cells, one recurrent vein and one or two closed anal cells; the anterior tarsi of the female are three jointed, of the male five jointed; the abdomen is heavily chitinized, cylindrical, the first tergite joined to the thorax by its entire width but not becoming part of the second division of the body, the second segment united with the first by its entire width and not separated from it by a socket-like joint; the first two tergites are more coarsely sculptured than the following, and the suture between the second and third is foveolate. Lying below and on each side of the eighth tergite in the female is a large heavily chitinized plate, the two together forming ventrally a channel for the reception of the ovipositor, and each bearing at its tip a small triangular appendage. These plates apparently represent the fused ninth and tenth tergites which are longitudinally divided dorsally, and the appendages are apparently the cerci; the eighth sternite is internal and lies above and somewhat behind the ninth, and is represented by two triangular plates, from the upper angle of which originate the lancets (first gonopophyses),¹ the ninth sternite is also internal, lying below and in front of the eighth and represented by two more or less triangular plates which extend postero-ventrad; the lance (second gonopophyses) originates from the inner ends of these plates and becomes fused a short distance cephalad of its origin; the two parts of the sheath (third gonopophyses) arise from the apices. Shortly cephalad of the origin of the lance and lancets the latter enter the groove of the former, the complete ovipositor as thus formed extending cephalad in an inverted position enclosed within a membranous sac, probably invaginated intersegmental skin, into the mesothorax, where it is coiled, and returning upon itself continues caudad in its normal position and enters the base of the sheath.

The reason for the formation in the pupa of the long external ovipositor is inexplicable, and its reduction to the form existing

¹ Snodgrass (Tech. Ser. 18 Bur. Ent. U. S. Dept. Agr., 1910, p. 25). Numbers were, outer gonopophyses of the ninth sternite 2 and the inner 3. This numbering is not in accord with the numbering further on in the work. In the present paper the numbering of the gonopophyses of the 9th sternite as given by Snodgrass on p. 25, figures 7 and 8, is reversed.

in the adult is equally inexplicable. This is rendered all the more difficult to understand by the fact that in the prepupa the ovipositor is coiled as it is in the adult, while in the pupa it forms a simple loop in the thorax.

In the male the abdomen is composed largely of eight large visible tergites and nine sternites (the first being a small plate concealed under the coxae). Lying between the apices of the 8th tergite and 9th sternite are two small plates connected by weakly chitinized tissue with the 8th tergite; the exact nature of these is not clear; but apparently the connecting tissue is the fused 9th and 10th tergites and the plates themselves are the cerci. The 10th sternite is apparently fused with the large ninth and the appendages which make up the genitalia do not materially change the appearance of the 8th and 9th sternites.

Larval characters:—The larva of only one species is known and what characters are known will be found in the above description of the larva of *Oryssus*.

Key to suborders of Hymenoptera.

- | | |
|--|------------------------------|
| Adults and pupae..... | 1 |
| Larva..... | 3 |
| 1. The first abdominal segment so consolidated with the thorax as to be a part of the second division of the body, the posterior part of which bears a spiracle; the separation between the first (propodeum) and second abdominal segments marked by a distinct socket form articulation; in short the abdomen is divided into two parts, propodeum and gaster..... | <i>Clistogastra</i> Konow. |
| — The first abdominal segment not forming a part of the second division of the body; the first (basal plates or propodeum) and second abdominal segments united by their entire width and not separated by a socket like articulation; in short the abdomen is not divided into two parts..... | 2 |
| 2. Metapostnotum wanting; antennae inserted much below the lower margin of the eye; wings with two cubital cells and with only one recurrent vein; ovipositor concealed within the body and extending anteriorly so it is coiled in the mesothorax. | |
| — Metapostnotum present; antennae inserted above lower margin of eye; wings with more than two cubital cells and with two recurrent veins; ovipositor not concealed or extending anteriorly into the thorax..... | <i>Chalastogastra</i> Konow. |
| 3. Mouthparts more or less complex, maxillary and labial palpi distinctly jointed; antennae usually jointed..... | <i>Chalastogastra</i> . |
| — Mouthparts much reduced, palpi, if present soft and papilla-like; antennae like palpi; ocelli wanting..... | 4 |

4. Palpi apparently not present; mandibles tridentate, the middle tooth longest, lateral teeth equal.....*Idiogastra*.
 — Palpi papilliform; mandibles various, if dentate the ventral tooth is longest.....*Chistogastra*.

GENUS ORYSSUS LATREILLE.

In originally proposing the genus *Oryssus* Latreille used the spelling *Orussus*, but in his later works he corrected this lapsus to *Oryssus*. This later spelling is the better form and has been the one constantly used and should therefore be retained.

In Mr. Rohwer's synopsis of the North American species of *Oryssus* (Proc. U. S. Nat. Mus., vol. 43, 1912, pp. 141-158) the shape of the hypopygidium was used as a specific character and from the material which was examined at that time it held very satisfactorily. Considerable new material coming in from the West and from the East indicates that although these characters hold for a great proportion of the specimens there occasionally arises a case when it is difficult to determine in which group the individual should be placed. It seems therefore that this cannot be used as a specific character especially as all of the individuals in one of the recent series came from the same locality at the same time and under similar conditions. So far in the material now available the emargination of the facial flange (= clypeus, authors) proves reliable but it seems possible that this character too may be found to vary. If this is the case Group B. II will be a species and known as *occidentalis*.

***Oryssus terminalis* Newman.**

Oryssus terminalis Newman, Ent. Mag., vol. V, 1838, p. 486; Rohwer, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 150.

Oryssus haemorrhoidalis Harris, Rept. Insects of Mass., 1841, p. 394; Rohwer, l.c., p. 151.

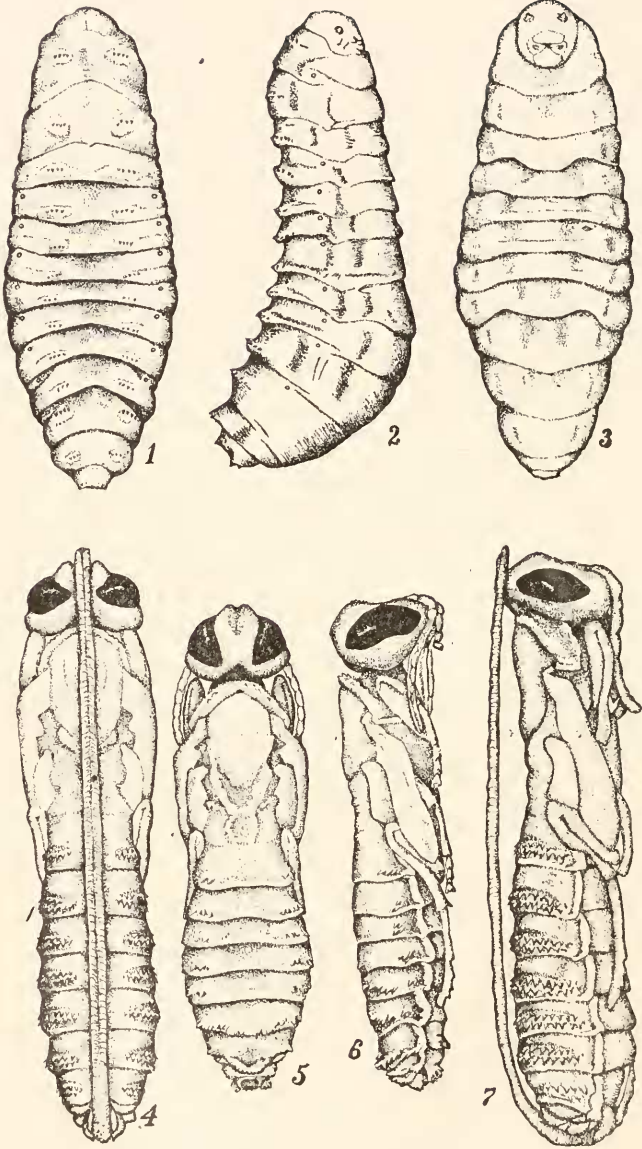
A number of specimens of this species have been collected around Harrisburg by W. S. Fisher. We have not yet been able to locate a male to go with this female, and it is possible that the male of this species will have the abdomen entirely black and that it is at present confused under the name, *sayi*.

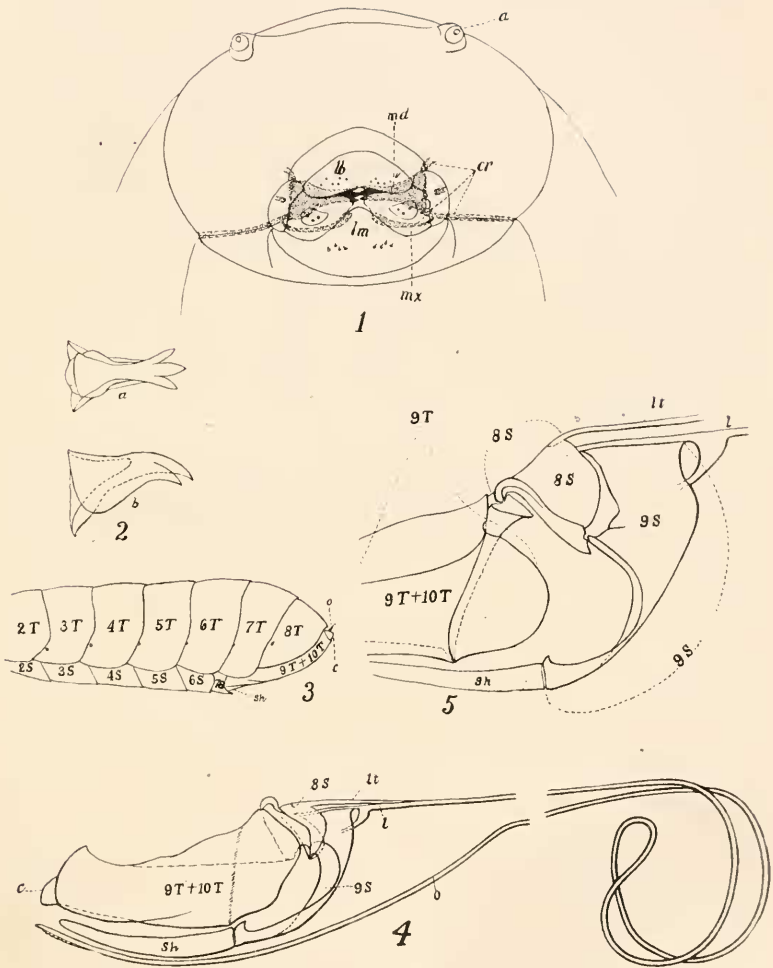
***Oryssus occidentalis* Cresson.**

Oryssus occidentalis Cresson, Proc. Ent. Section, Acad. Nat. Sci., Phila., 1879, p. 9; Rohwer, l.c., p. 153.

Oryssus abietis Rohwer, l.c., p. 153.

In a series of specimens collected recently by Mr. Burke and his associates there are a few individuals which are intermediate in the shape of the hypopygidium between the type of *occidentalis*





and the type of *abietis* and it seems that they represent only one species. In the male the yellow varies from continuous inner orbital line to superorbital spots.

EXPLANATION OF PLATES.

Plate XI. *Oryssus occidentalis* Cress. Drawn by Miss Eleanor Armstrong.

Fig. 1. Larva, dorsal view. Fig. 2. Same, lateral view. Fig. 3. Same, ventral view. Fig. 4. Female pupa, dorsal view. Fig. 5. Male pupa, dorsal view. Fig. 6. Male pupa, lateral view. Fig. 7. Female pupa, lateral view.

Plate XII. *Oryssus occidentalis* Cress. Drawn by R. A. Cushman.

Fig. 1. Larva, facial view of head; *a*, antennae; *lb*, labrum; *lm*, labium; *md*, mandible; *mx*, maxilla; *cr*, chitinized ridges for articulation of mandibles. Fig. 2. Larva, mandible; *a*, internal view; *b*, ventral view. Fig. 3. Abdomen of female from side. Fig. 4. Detail of ovipositor and apical segments from side. Fig. 5. Detail of ovipositor, dorso-lateral view; *T* = tergite; *S* = sternite; *ll* = lancet; *l* = lance; *sh* = sheath; *o* = ovipositor; *c* = cerci.

In discussion Mr. Baker thought the elevation of the Oryssidae into a suborder would necessitate other changes in the classification of the Hymenoptera. He pointed out the generally understood position of the Oryssidae and its seeming relation with the Siricidae. He stated that in the separation of the scutellum, the one tibial spur, the loss of the notauli, proepimeron, etc., the two families show striking affinities as well as a resemblance in the wings. The entirety of the median plate and the specialization of the head has been known even while placing the family close to the Siricidae. Even the parasitic habit was indicated years ago by Harrington. The remaining characters then, on which the suborder is erected are, Mr. Baker thought, structures in the early stages and modifications of the ovipositor due to parasitic mode of life. He thought that Ashmead may have had some notion of these structures when he suggested the family as the possible ancestor of some of the parasitic forms. Mr. Baker also pointed out that out of five genera, excluding *Lithorissus*, and numerous species, the immature stages of only one species had been studied and adults of only one dissected. It is possible he thought that others might show some differences and at any rate he claimed that if the suborder were erected it would